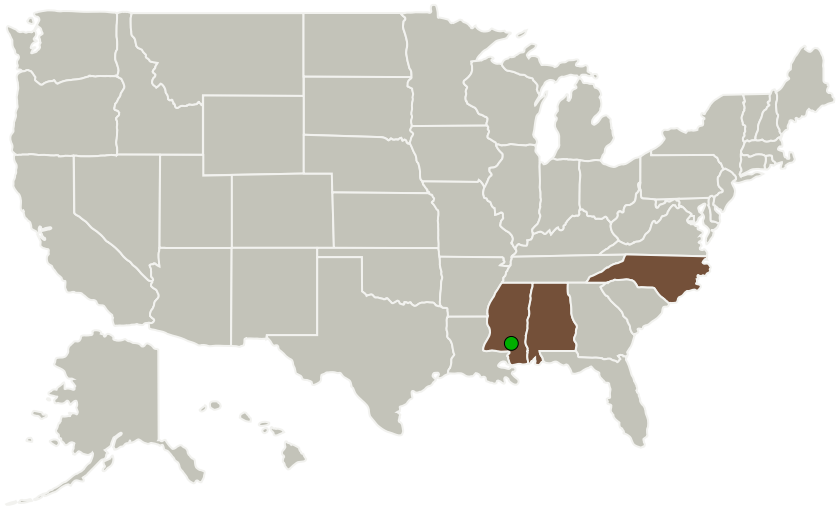
Power Generating Coverings and Casings, Phase I

Completed Technology Project (2013 - 2014)

Project Introduction

Advances in structured heterogeneity together with nanomaterials tailoring has made it possible to create thermoelectrics using high temperature, polymer composites. While such thermoelectrics do not have the capability to approach the efficiency of top performing ceramic modules such as BiTe, they do provide two unique aspects of use in energy scavenging: the ability to cover large areas easily, and the ability to integrate kinetic energy scavenging together with heat scavenging. Recently the group at Wake Forest University has demonstrated a novel design for internal p/n junction formation in such composites, that allows for a significant increase in thermoelectric voltage and power factor while retaining the form factor of a fabric. This improvement in nanocomposite thermoelectric performance, coupled with effective kinetic energy scavenging makes the piezo-thermo-electric "PowerFelt™" applicable to a wide range of power collection scenarios. This Phase I program will demonstrate that the PowerFelt™ construct can rival small ceramic modules in overall power generation in a fully flexible, lightweight platform. Further, we will show that it is compatible with advanced manufacturing techniques such as printing, with cost profiles of ~$0.5/W.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Streamline Automation, LLC	Lead Organization	Industry	Huntsville, Alabama
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
Wake Forest University	Supporting Organization	Academia	Winston-Salem, North Carolina

Primary U.S. Work Locations	
Alabama	Mississippi
North Carolina	

Project Transitions

May 2013: Project Start

May 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140480)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Streamline Automation, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

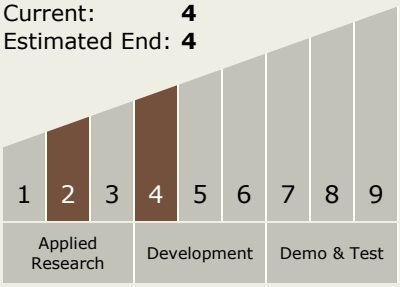
Carlos Torrez

Principal Investigator:

William M Chew

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Images

Project Image
Power Generating Coverings and Casings
(https://techport.nasa.gov/image/131860)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System